

AUTHENTICATION METHOD OF PORTABLE TERMINAL

Background of the Invention

Field of the Invention

5 This invention relates to an authentication method of a portable terminal. More particularly, this invention relates to an authentication method of a portable terminal, which enables fast and easy access (log-in) to various kinds of servers that require user authentication and are provided on an information communication network constituted by either a public line network or a private line network such as the Internet.

Description of the Prior Art

10 In recent years, by the progress of information communication networks such as the Internet, utilization of the Internet by operating information processing apparatuses having communication functions capable of access to the information communication networks such as personal computers have been increased. Portable terminals having functions capable of accessing the Internet are also appeared from among such portable terminals as mobile phones and PHS (Personal Handyphone System), that have been rapidly popular in these days and utilizing the Internet by these portable terminals is materially increased.

20 In the conventional way of utilizing the Internet from a portable terminal adaptable to Compact HTML (HTML 4.0 based) via a gateway server accessible by the portable terminal (Compact HTML-adaptable portable terminal) to either a server provided on the Internet or the above-mentioned gateway server (namely, gateway server equipped with predetermined server function) that require user authentication, accesses are carried out as shown

in Figs. 8 and 9. Referring now to Figs. 8 and 9 showing the conventional authentication methods of the portable terminals, the more detailed description will be made hereinbelow.

According to the authentication method shown in Fig. 8, both  
5 an ID and a password of a user are entered on a display screen such as liquid crystal display and the like of a portable terminal so as to execute an authentication process. A screen (user authentication screen) shown in Fig. 8(a) to be used to log in (user authentication) a desired server is displayed on a display  
10 screen by operating the portable terminal. Then, both a predetermined ID and a predetermined password are entered as shown in Fig. 8(b). Subsequently, a character (icon or the like) of "log-in" shown on the display screen is selected by an operation of the portable terminal. When the log-in (authentication)  
15 process is completed normally, accesses to either the server or the gateway server, which are provided on the Internet, become possible.

However, in accordance with the above-mentioned conventional authentication method, in the case where both the ID and the password  
20 composed of complex character strings should be input in the portable terminal, the problem is that it takes a quite long time to input such ID and password and is very inefficient.

According to another authentication method shown in Fig. 9, accesses from a portable terminal to a desired server are  
25 performed via such a gateway server in which both an ID and a password of the user have been saved in advance, and authentication is carried out by the desired server by using the ID and the password saved in the gateway server. In other words, by an operation of the portable terminal, such a screen (user authentication screen)

as shown in Fig. 9(a) used to log in the desired server is displayed, and then, a character (icon or the like) of "log-in" is displayed on the display screen. Whereby, both the ID and the password of the user which are saved in advance in the gateway server are  
5 sent to the desired server (another gateway server may be included), so that the log in (authentication process) this server may be executed. When the log-in (authentication) process is completed normally, accesses to either the desired server or another gateway server which is provided on the Internet, become possible.

10 However, in accordance with the above-mentioned conventional authentication method, the IDs and passwords of the users, that are previously stored into the gateway server, may be ripped off in case of intrusion by a cracker and the like, thereby a security problem may occur.

#### Summary of the Invention

15 Accordingly, an object of the present invention is to provide such an authentication method of a portable terminal, capable of improving securities of both an ID and a password, and also  
20 capable of logging in a desired server which requires authentication of a user, in a short time and in a simple manner.

25 According to one aspect of the present invention, an authentication method of a portable terminal, wherein a Compact HTML-adaptable portable terminal equipped with a screen memo function capable of saving thereinto a source file of Compact HTML logs into various kind of servers which require user authentication and are provided on an information communication network, comprises the steps of: inputting a key code based upon said screen memo function into said portable terminal, to which

both user information and said key code corresponding to said user information have been previously registered, said user information being used when said predetermined server executes an authentication process of said portable terminal; transmitting  
5 said user information corresponding to said key code from said portable terminal to said predetermined server in response to the inputting of said key code; and logging in said predetermined server which receives said user information and executes the authentication process based upon said user information by said  
10 portable terminal.

Also, according to the present invention, the user information is composed of both a user ID and a password, which are used to log in the predetermined server.

Also, according to the present invention, contents of such data as the user ID, the password, and the key code, which have  
15 been registered in the screen memo in the portable terminal, are constituted in such a manner that the data contents cannot be observed from the outside of the portable terminal.

Also, according to the present invention, the key code is  
20 composed of a numeral having a plurality of digits.

Further, according to the present invention, the various kind of servers which require the user authentication and are provided on the information communication network are connected via a gateway server to the portable terminal.

25 In the authentication method of portable terminal according to the present invention, since the contents of the log-in data such as the ID, the password, and the key code, which are saved as the screen memo in the Compact HTML-adaptable portable terminal, are not displayed on screen of portable terminal and cannot be

observed from the outside, the higher security can be ensured.

Also, the user can access the server which requires the user authentication by merely entering a key code set by the user himself/herself into the portable terminal.

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#### Brief Description of the Drawings

The invention will be explained in more detail in conjunction with appended drawings, wherein:

Fig. 1 is a block diagram showing an example of a system configuration when a Compact HTML-adaptable portable terminal directly accesses to a Web server or the like that requires user authentication;

Fig. 2 is a block diagram showing an example of a system configuration when a Compact HTML-adaptable portable terminal accesses via a gateway server to a POP server or the like, that requires user authentication;

Fig. 3 is a flow chart illustrating a screen memo registration process;

Fig. 4 is a diagram showing an example of screens displayed in the portable terminal while the screen memo registration process is carried out in the system shown in Fig. 1;

Fig. 5 is a diagram showing an example of screens displayed in the portable terminal while the screen memo registration process is carried out in the system shown in Fig. 2;

Fig. 6 is a flow chart illustrating a process of a simple log-in to a server which requires user authentication by utilizing a screen memo function;

Fig. 7 is a diagram showing an example of screens displayed in the portable terminal while a simple log-in process is performed

in the systems shown in Figs. 1 and 2;

Fig. 8 is a diagram showing a conventional authentication method of the portable terminal; and

Fig. 9 is a diagram showing another conventional authentication method of the portable terminal.

#### Detailed Description of the Preferred Embodiments

Referring to drawings, preferred embodiments of the present invention will be described below.

Figs. 1 and 2 are block diagrams showing examples of system configurations to implement a authentication method of a portable terminal according to the present invention.

Fig. 1 shows an example of a system configuration where a user directly accesses from a portable terminal adaptable to Compact HTML to a Web server or the like that requires user authentication.

Fig. 2 shows an example of a system configuration where a user accesses from a portable terminal adaptable to Compact HTML via a gateway server to a POP server or the like that requires user authentication.

In the system shown in Fig. 1, a portable terminal 1 is provided with a display 2 for visually communicating various kinds of information to a user, a memory 3 for storing user information i.e. an ID, a password or the like necessary for an access to a server which requires user authentication, and an input key 4 for inputting data. The user information will also referred to as "log-in information" hereinafter, and the ID, the password or the like are specific to each of the servers. Moreover, the memory 3 implement a screen memo function, which will be explained later.

Furthermore, the portable terminal 1 is connected via the Internet 5 to a server 6 which require user authentication. It should also be noted that whereas only a server 6 is shown in Fig. 1 as a server which requires user authentication, a plurality of servers accessible by the portable terminal 1 are apparently available on the Internet 5. Although not shown in this drawing, the portable terminal 1 is connected to the Internet 5 via a base station of the portable terminal 1 and a gateway server provided therein.

Referring now to the system shown in Fig. 2, similar to the system shown in Fig. 1, a portable terminal 1 is provided with a display 2 for visually communicating various kinds of information to a user, a memory 3 for storing user information i.e. an ID, a password or the like necessary for an access to servers which require user authentication, the ID, the password or the like being specific to each server, and an input key 4 for inputting data. Moreover, the memory 3 implement a screen memo function, which will be explained later.

Furthermore, the portable terminal 1 is connected via the Internet 5, a gateway server 7, and again Internet 5 to a POP server 8 or the like that requires user authentication. Similar to the system shown in Fig. 1, it should also be noted that although not shown in this drawing, the portable terminal 1 is connected to the Internet 5 via a base station of the portable terminal 1 and a gateway server provided therein.

A description in detail will now be made of an authentication method (simple log-in) of a portable terminal according to the present invention, with reference to Figs. 3 to 7. The authentication method of the present invention is carried out

by utilizing the screen memo function included in the portable terminal 1 (Compact HTML-adaptable portable terminal).

Referring to Figs. 3 and 4, a screen memo registration process (hereinafter also referred to as "simple log-in registration process") operated in the system shown in Fig. 1 will now be described.

Fig. 3 is a flow chart illustrating a screen memo registration process, and Fig. 4 is a diagram showing an example of screens displayed in the portable terminal while the screen memo registration process is carried out in the system shown in Fig. 1.

First, in response to an operation of the portable terminal 1, a log-in registration screen to be used to log in a desired server, that is, a screen for user authentication, is displayed on the display 2 (hereinafter also referred to as a "display screen") as shown in Fig. 4(a) (Step S1, S8). The log-in registration screen is displayed in the case where the log-in registration has not been established with respect to the desired server, for example. As shown in Fig. 4(a), both a predetermined ID and a predetermined password are entered by input key 4 (step S9). Then, a character (icon or the like) of "simple log-in" displayed on the screen is selected by operating the portable terminal 1.

In response to this selection, the portable terminal 1 accesses to the desired server (Web server, POP server, or the like) via the Internet 5. The server determines as to whether or not both the ID and the password entered at the step S9 are correct (authenticated) (step S10). If not authenticated by the server, a screen indicating a result that the entered ID/password are incorrect is displayed (step S11), and then, the screen is returned to the log-in registration screen shown in Fig. 4(a) (step S8).



When it is verified that both the ID and the password are correct by the server at step S10, a screen (key code input screen) shown in Fig. 4(b) is displayed on the display 2 (step S12). A key cord, e.g. an arbitrary numeral of four digits desired by  
5 a user is input by input key 4 (step S13) as shown in Fig. 4(b).

Furthermore, when a character (icon or the like) of "registration" displayed on the screen is selected by an operation of the portable terminal 1, a screen shown in Fig. 4(c) is displayed (step S14).

If a registration of the screen is selected by the screen memo  
10 function included in the portable terminal 1, the contents of the screen are stored into the memory 3 thereof (step S15).

As described above, the screen memo registration process in the system shown in Fig. 1 is carried out. Once the screen memo registration process has been performed, an easy access to  
15 the desired server on the Internet becomes possible. That is to say, when next time a log-in the server is attempted, a screen shown in Fig. 4(c) is initially displayed; the four-digit numeral described above is input by the input key 4; and then a character (icon or the like) of "log-in" displayed on the screen is selected  
20 by an operation of the portable terminal 1, whereby the access is complete.

Referring to Figs. 3 and 5, a description will now be made of a screen memo registration process (simple log-in registration process) carried out in the system shown in Fig. 2. Fig. 5 is  
25 a diagram showing an example of screens displayed in the portable terminal when the screen memo registration process is carried out in the system shown in Fig. 2.

The following description is made in the case where the screen memo registration process (simple log-in registration process)

is carried out in the system shown in Fig. 2, wherein an access to the POP server 8 via the gateway server 7 is carried out so as to transmit/receive an electronic mail. For this purpose, it should be understood that a POP user ID and a POP server name have been stored as user information into the gateway server 7 in advance.

First, in response to an operation of the portable terminal 1, a log-in registration screen to be used to log in a desired server (POP server), that is, a screen for user authentication, is displayed on the display 2 (display screen) as shown in Fig. 5(a) (Step S1, S2, S3 and S4). The log-in registration screen is displayed in the case where the log-in registration has not been established with respect to the desired server, for example.

As shown in Fig. 5(a), a predetermined password is entered by input key 4 (step S5). Then, a character (icon or the like) of the "simple log-in" displayed on the screen is selected by operating the portable terminal 1.

In response to the selection, the portable terminal 1 accesses to the desired server (POP server 8) via the Internet 5. The server determines as to whether or not the password entered at step S5 are correct (authenticated) (step S6). If not authenticated by the server, a screen indicating a result that the entered password is incorrect is displayed (step S7), and then, the screen is returned to the log-in registration screen shown in Fig. 5(a) (step S4).

When it is verified that the password is correct by the server at step S6, a screen (key code input screen) shown in Fig. 5(b) is displayed on the display 2 (step S12). A key cord, e.g. arbitrary numeral of four digits desired by a user is input by input key

4 (step S13) as shown in Fig. 5(b). Furthermore, when a character (icon or the like) of the "registration" displayed on the screen is selected by an operation of the portable terminal 1, a screen shown in Fig. 5(c) is displayed (step S14). If a registration  
5 of the screen is selected by the screen memo function included in the portable terminal 1, the contents of the screen are stored into the memory 3 thereof (step S15).

As described above, the screen memo registration process in the system shown in Fig. 1 is carried out. Once the screen memo registration process has been performed, an easy access to the desired server (POP server 8) on the Internet becomes possible.

That is to say, when next time a log-in the server is attempted, a screen shown in Fig. 5(c) is initially displayed; the four-digit numeral described above is input by the input key 4; and then  
10 a character (icon or the like) of the "log-in" displayed on the screen is selected by an operation of the portable terminal 1, whereby the access is complete.

Next, referring to Figs. 6 and 7, a description will now be made of a simple log-in, by utilizing a screen memo, to a server  
20 which requires user authentication the systems shown in Figs. 1 and 2. Fig. 6 is a flow chart illustrating a process of simple log in the server which requires the user authentication by utilizing the screen memo, while Fig. 7 is a diagram showing an example of screens displayed in the portable terminal when the  
25 simple log-in process is carried out in the systems shown in Figs. 1 and 2. It should be understood that such user information to be used to log in a predetermined server as user IDs and user passwords that is specific to each server have been registered in the screen memo in advance, wherein the user information

corresponds to a log-in server number and is described in Compact HTML.

First, in response to a selection of the screen memo function by operating the portable terminal 1, a registered screen memo  
5 list is displayed on the display 2 (display screen) as shown in Fig. 7(a) (step T1). A user selects a server number (icon or the like) of a server which the user desires to log in from the screen memo list (step T2).

10 In response to the selection, a key code input screen as shown in Fig. 7(b) is displayed (step T3). The user inputs, from the input key 4, a 4-digit numeral (key code) which is necessary to log in the desired server (log-in server number) and is identical to that having been registered in advance in the above-mentioned  
15 screen memo registration process (simple log-in registration process, and then operates the portable terminal 1 to select a character (icon or like) of the "log-in" displayed on the screen (step T4).

Subsequently, the portable terminal 1 determines as to whether or not the key code entered at step T4 is correct (namely, whether  
20 the key code is authenticated by the desired server) (step T5).

In the case where the portable terminal determines that the key code is not correct, a screen indicating a result that the entered key code is incorrect is displayed (step T6), and then, the screen is returned to the key code input screen shown in Fig. 7(b) (step  
25 T3). It should be noted that the determination of the key cord at step T5 may be executed by either a server 6 or a gateway server 7.

When it is determined that the entered key code is correct at step T5, a log-in process to the server by using both an ID

and a password corresponding to the above-mentioned key code and stored in the screen memo in advance is carried out (step T7).

The portable terminal 1 displays Compact HTML received from the server on the display 2 after the log-in (step T8). It should  
5 also be noted that the above-mentioned key code, and both the ID and the password corresponding to the key code, are registered as the screen memo into the memory 3 of the portable terminal 1 in a Compact HTML format as shown in Fig. 7(c). In this case, these ID, password, and key code are defined in such a manner  
10 that these data contents are not to be displayed on the display 2 of the portable terminal 1.

As described above, the simple log-in process to the server which requires the user authentication is carried out by utilizing the screen memo in the systems shown in Figs. 1 and 2.

As mentioned above, the present invention makes it possible  
15 to substantially improve the user-friendliness in the case of an access from a portable terminal to a server which requires user authentication, by simplifying a task of the character string input on the display screen of the portable terminal, in which  
20 the complex character string input would be troublesome.

While the password of the user is saved only in the portable terminal owned by the user without being saved in other servers such as a gateway server and the like. Furthermore, a key code, which is defined by the user by correlating the key code with  
25 each user information i.e. the log-in information specific to each server which requires user authentication such as the password, is necessarily required every the server is utilized. As a consequence, the double security, that is, multiplier effect of security, can be achieved, and the higher safety characteristic

(firewall) can be secured against crackers and the like.

As mentioned above, according to the authentication method of the portable terminal of the present invention, the log-in data for access to a server which requires user authentication such as an ID, a password, and a key code or the like are described in Compact HTML, and are saved as the screen memo in the Compact HTML-adaptable portable terminal, so that the password and the like can be securely protected from the crackers and the like.

Furthermore, the contents of the log-in data such as the ID, the password, and the key code, or the like, which are saved as the screen memo in the Compact HTML-adaptable portable terminal, are not displayed on screen of portable terminal and cannot be observed from the outside, so that the higher security characteristic can be ensured.

Additionally, even in the case of accesses via the gateway server to the desired server which requires the user authentication in the system shown in Fig. 2, since the password of the user is not saved in the gateway server, and accordingly the higher security can be ensured with respect to the user information on the side of the gateway server.

The preferred embodiment of the present invention has been disclosed by way of example and it will be understood that other modifications may occur to those skilled in the art without departing from the scope and the spirit of the appended claims.